UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/757,856	01/11/2001	Dale C. Flanders	1028-CO	8212

25263 7590 05/13/2004

J GRANT HOUSTON
AXSUN TECHNOLOGIES INC
1 FORTUNE DRIVE
BILLERICA, MA 01821

EXAMINER	
JEFFERY, JOHN A	

ART UNIT	PAPER NUMBER
3742	

DATE MAILED: 05/13/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

UNITED STATES PATENT AND TRADEMARK OFFICE

COMMISSIONER FOR PATENTS
UNITED STATES PATENT AND TRADEMARK OFFICE
P.O. BOX 1450
ALEXANDRIA, VA 22313-1450
www.uspto.gov

BEFORE THE BOARD OF PATENT APPEALS AND INTERFERENCES

Paper No. 20040506

Application Number: 09/757,856
Filing Date: January 11, 2001
Appellant(s): FLANDERS ET AL.

J. Grant Houston
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed March 8, 2004.

(1) Real Party in Interest

A statement identifying the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

A statement identifying the related appeals and interferences which will directly affect or be directly affected by or have a bearing on the decision in the pending appeal is contained in the brief.

(3) Status of Claims

The statement of the status of the claims contained in the brief is incorrect. A correct statement of the status of the claims is as follows:

Upon further reconsideration, the examiner has decided to withdraw the final rejection of claims 6, 14, 16, and 17. Accordingly, only claims 1-5, 7-12, and 15 remain finally rejected.

Claims 6 and 14 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Claims 16 and 17 are allowed.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Invention

The summary of invention contained in the brief is correct.

(6) Issues

The appellant's statement of the issues in the brief is correct.

(7) Grouping of Claims

Appellant's brief includes a statement that (1) claims 1-4, 8-12, and (2) the remaining claims on appeal do not stand or fall together and provides reasons as set forth in 37 CFR 1.192(c)(7) and (c)(8).

(8) Claims Appealed

The copy of the appealed claims contained in the Appendix to the brief is correct.

(9) Prior Art of Record

5,563,969	HONMOU	10-1996
6,301,406	IRIE et al.	10-2001
4,758,386	FANNING	7-1988

(10) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-5 and 7-11 are rejected under 35 U.S.C. 103(a) as being obvious over Honmou (US 5,563,969) in view of Irie et al (US 6,301,406). Honmou discloses a method and apparatus for fusing an optical fiber lens including injecting light into the fiber via laser 5, detecting the far-field image pattern via detector 6 mounted about 10 cm from the end surface of the fiber (col. 3, line 53), and using the recognized image as a control signal to control the discharge of electrodes for fiber electro-fusion using control system 2. See Fig. 3 and entire document.

While the reference is silent as to the far-field pattern being a diffraction pattern, in view of (1) the detector's image recognition capability and ability to produce a picture signal (col. 3, lines 54-58), and (2) the nature and characteristics of the far-field pattern detected resulting from light exiting the fiber end, the detector 6 inherently detects a diffraction pattern of light. If such inherency is disputed, then the detection of a diffraction pattern from the far-field image detected by detector 6 would have been obvious to one of ordinary skill in the art in view of the nature and characteristics of the image of the far-field pattern detected resulting from light exiting the fiber end.

The claims differ from the previously cited prior art in calling the fiber to have a wedge-shaped lens formed by polishing. Providing a wedge-shaped fiber lens is conventional and well known in the art as evidenced by Irie et al noting wedge-shaped lens 26 formed on the end of optical fiber 20 for improved optical coupling efficiency, yet the lens can be fabricated with high accuracy and yield. See col. 1, lines 57-63 and col. 2, lines 42-57. According to col. 2, lines 63-67, the wedge-shaped lens is formed by polishing the fiber. In view of Irie et al, it would have been obvious to one of ordinary

skill in the art to provide a wedge-shaped lens formed by polishing in the previously described apparatus in order to improve optical coupling efficiency, yet fabricate the lens with high accuracy and yield.

Claims 12 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over Honmou in view of Irie et al and further in view of Fanning (US 4,758,386). The claims differ from the previously cited prior art in calling for the controller to activate the arc fuser in a pulsed fashion. Controlling an arc fuser in a fiber lens producing apparatus is conventional and well known in the art as evidenced by Fanning (US47583886) noting Col. 1, lines 12-15 wherein Fanning teaches that, in a lens-making process, the arc can be more closely controlled by repeatedly turning it on and off. In view of Fanning, it would have been obvious to one of ordinary skill in the art to activate the arc fuser in a pulsed fashion in the previously described apparatus so that the arc can be more closely controlled by repeatedly turning it on and off.

(11) Response to Argument

The examiner has fully considered appellant's arguments asserted in the Appeal Brief ("Brief"). For the reasons set forth below, however, appellant has not overcome the examiner's *prima facie* case of obviousness under 35 U.S.C. § 103(a) of claims 1-5, 7-12, and 15. Accordingly, the Board must affirm the examiner's rejection of those claims.

1. Honmou Discloses Electrofusing an Optical Fiber Lens Responsive to a Two-Dimensional Distribution of the Diffraction Pattern.

A. Honmou's Detected Diameter Ultimately Represents the Shape of a Two-Dimensional Diffraction Pattern.

Appellant alleges that neither Honmou nor Irie et al. shows nor suggests electrofusing a fiber lens in response to a two-dimensional distribution of the diffraction pattern.[1] Rather, according to appellant, fusing is responsive only to the diameter. Brief at 4.

Although diameter, standing alone, is a one-dimensional measure of length, diameter ultimately represents the size and shape of a two-dimensional circular pattern of laser light emitted from the end of optical fiber 3. In short, the larger the diameter, the larger the circular light pattern. Thus, there is a direct correlation between the diameter and the size and shape of a two-dimensional distribution. And it is this shape of the far-field pattern that Honmou uses to control the electrofusion process.[2]

For example, Fig. 2A of Honmou depicts a small diameter of the detected pattern before heating (i.e., F.F.P. at time t_0 in Fig. 4A). But as heating progresses, the fiber's core gradually becomes hemispherical, thus enlarging the diameter of the detected pattern of light exiting the fiber. *Compare* Fig. 2B *with* Fig. 2A. It is at this point that the diameter is largest (i.e., optimum two-dimensional shape) and the optical coupling loss

---

[1] Because the examiner did not cite Irie et al ("Irie") to show this feature, but rather to cure the deficiencies of Honmou with respect to the polished wedge-shaped fiber lens, the examiner's discussion will be confined to Honmou. However, because appellant's arguments were not germane to the reason the examiner cited Irie – namely to show it is well-known in the art to provide a polished wedge-shaped lens in an optical fiber for improved optical coupling efficiency – appellant did not overcome the examiner's *prima facie* case of obviousness in combining Irie with Honmou under § 103(a).

[2] Note Honmou's express teaching of the detected pattern "shape" as the electrofusion control parameter in (1) lines 5 and 10 of the abstract; (2) col. 5, line 47; and (3) col. 6, line 35.

is minimized. Honmou, col. 4, lines 17-19. Further heating beyond this optimum point, however, results in a decrease in the diameter with a concomitant increase in coupling loss. *Compare* Fig. 2C *with* Fig. 2B. Honmou emphasizes this effect in Fig. 4A by graphing detected pattern diameter over time and shows that the optimum pattern shape occurs between t_1 and t_2.

B. Honmou's Pattern Diameter Calculation Process Necessarily Analyzes a Two-Dimensional Diffraction Pattern Distribution.

Notwithstanding the fact that the detected circular diffraction pattern is a two-dimensional shape, the very nature of Honmou's pattern diameter calculation process necessarily analyzes a two-dimensional diffraction pattern distribution. According to col. 3, lines 54-59, Honmou determines pattern diameter by undergoing image recognition of the emitted laser light that produces a "picture signal" representing a two-dimensional distribution of the light's brightness with respect to the center of the pattern.

As best seen in Fig. 4B, Honmou determines the point of maximum brightness I_0 at the center of the pattern (maximum of curve at intersection with vertical axis), and then finds the point along the vertical axis where brightness is reduced in half ($I_0/2$). At that point along the vertical axis, Honmou then measures the width of the pattern along the horizontal axis to determine the value of "full width at half maximum" (FWHM). The FWHM value is then outputted as the pattern diameter signal for control purposes. Honmou, col. 3, lines 57-61.

Therefore, Honmou's diameter calculation results from an analysis of values obtained along both axes of a two-dimension diffraction pattern distribution. For this

reason alone, Honmou meets the limitation of electrofusing the fiber lens responsive to a two-dimensional diffraction pattern distribution as claimed in appealed claims 1-5, 7-12, and 15. Accordingly, the Board must affirm the examiner's rejection under 35 U.S.C. § 103(a) of these claims.

2. The Board Must Affirm the Examiner's Rejection of Dependent Claims 7, 12, and 15.

Appellant did not separately argue the propriety of the examiner's rejection of claim 7 as being obvious over Honmou in view of Irie et al or claims 12 and 15 as being obvious over Honmou in view of Irie et al and further in view of Fanning. Consequently, appellant has not overcome the examiner's *prima facie* case of obviousness under 35 U.S.C. § 103(a) for those claims. Accordingly, the Board must affirm the examiner's rejection.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

John A. Jeffery
Primary Examiner
Art Unit 3742

John A. Jeffery
May 11, 2004

Conferees
Denise Pothier
Sang Paik

J GRANT HOUSTON
AXSUN TECHNOLOGIES INC
1 FORTUNE DRIVE
BILLERICA, MA 01821